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and **Erik Bollt**, **Ranil Basnayake** and **Sean Kramer**. *Regularization of Optical Methods for  
Computing Flow Dynamics*. Preliminary report.

Optical flow is the term used for the computation of flow fields from image data describing the evolution of a system. The classical variational formulation results in separate Euler-Lagrange equations for each component of the flow, but, when the flow is the gradient of a potential function, we can construct the potential directly from a single Euler-Lagrange equation. This allows us to impose regularity on the full flow, rather than on the components of the flow separately. We will show how this formulation leads to a more natural means of regularizing optical flow computations as well as how this formulation connects optical flow to classical image deblurring. The results of this approach will be demonstrated on ocean flows for which the classical formulation would generally fail. (Received September 21, 2011)